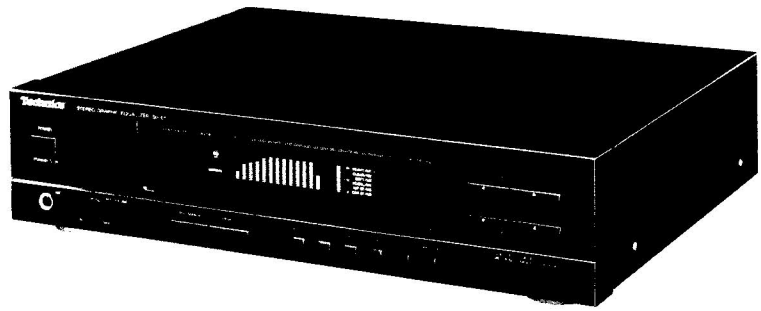
ORDER NO. AD9104089C8

Service Manual

Equalizer

Stereo Graphic Equalizer

SH-E51



Color

(K)... Black Type

Area

Country Code	Area	Color
(E)	Continental Europe.	(K)
(EB)	Great Britain.	
(EG)	F.R. Germany & Italy.	
(GC)	Asia, Latin America, Middle Near East and Africa.	
(GN)	Oceania.	

SPECIFICATIONS

(DIN 45 500)

Frequency response: 5 Hz~45 kHz (−3 dB)
Maximum output voltage: 6.2 V (1 kHz, THD 0.03%)
Rated output voltage: 1 V
Maximum input voltage: 6.2 V (1 kHz)
Rated input voltage: 1 V
Input impedance: 22 kΩ
Rated total harmonic distortion: 0.005% (20 Hz~20 kHz) at 1 V output
0.003% (1 kHz) at 1 V output
S/N: 93 dB/1 V
100 dB/1 V (IHF' A)
Gain: 0±1 dB
Equalization-level controls: +12 dB~−12 dB
(7 frequency ranges, in 2-dB steps)
Channel separation: 60 dB
Channel balance: ±0.5 dB
Center frequencies: 63 Hz, 160 Hz, 400 Hz, 1 kHz, 2.5 kHz, 6.3 kHz, 12.5 kHz
Mic input sensitivity: 0.8 mV/22 kΩ

Equalizer function: EQ ON/FLAT
Memory (FIXED) 1~6 ch
(MANAUL) 1~6 ch
Display mode (EQ/SPECTRUM. SPECTRUM 5 modes)

GENERAL

Power supply:
For (E, EB, EG, GN) areas: AC 50/60 Hz, 230–240 V
For (GC) area: AC 50/60 Hz, 110 V/127 V/220 V/240 V
Power consumption: 7.5 W
(with power switch at STANDBY: 5.7 W)
Dimensions (W×H×D)
For (EB, GC) areas.: 360 × 85 × 285 mm (14-3/16″ × 3-11/32″ × 11-7/32″)
For (GN) area.: 360 × 85 × 292 mm (14-3/16″ × 3-11/32″ × 11-1/2″)
For (E, EG) areas.: 360 × 85 × 296 mm
Weight: 2.5 kg (5.5 lb.)

Notes:
1. Specificatios are subject to change without notice. Weight and dimensions are approximate.
2. Total harmonic distortion is measured by the digital spectrum analyzer.

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Technics

■ CONNECTIONS

This is an equalizer that provides effects both during tape recording and playback if it is used while connected to an amplifier that has "EXT INPUT/OUTPUT" terminals.
If this unit is connected to an amplifier that does not have "EXT INPUT/OUTPUT" terminals, its effects are limited to playback only.

Make connections in the numbered sequence by using the included cables.

[1] Connect the stereo connection cables.

[2] Connect the L-type cable.

[3] Connect the AC power supply cord.

The illustration below shows an example of connections made when this unit is combined with a Technics hi-fi component system, and shows only the connections to be made to and from this unit in that combination.
Refer to the illustration together with the instructions provided below.

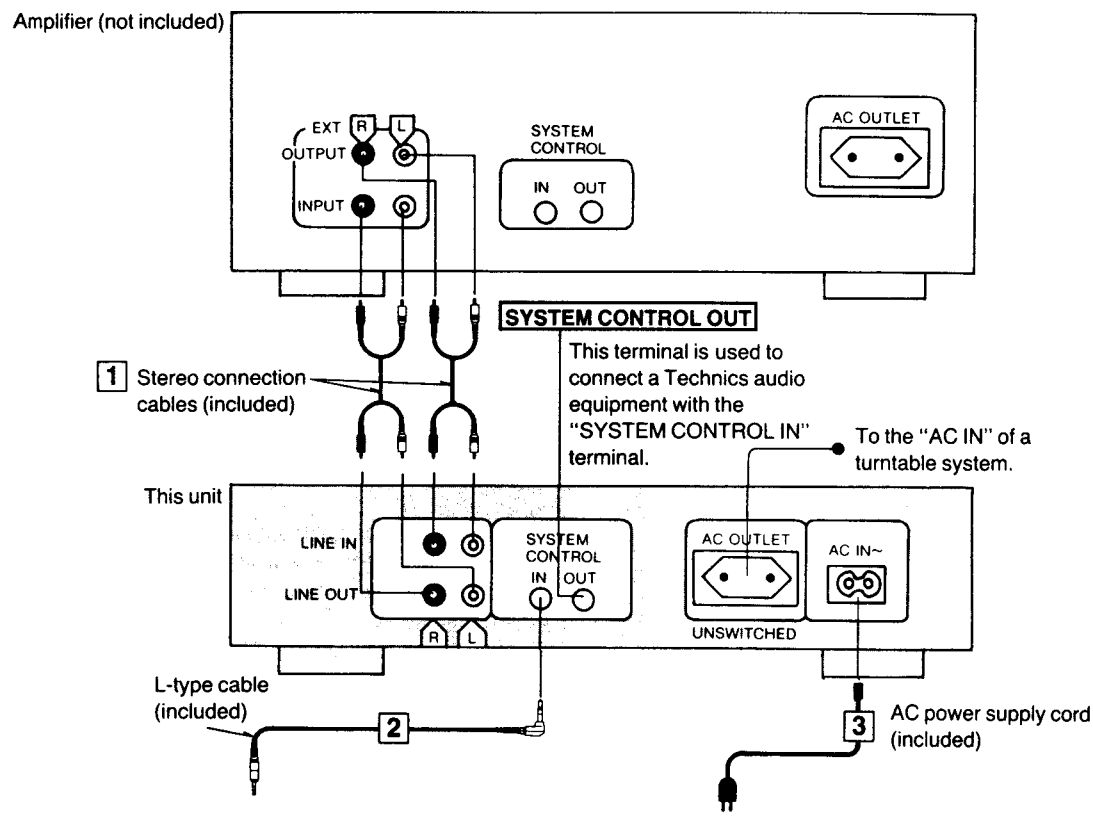
"UNSWITCHED" outlet

Power is always available, regardless of power switch.

This outlet is only for use with other audio equipment.
Also, do not exceed the indicated power rating when connecting to this outlet.
Note:
The cofiguration of AC outlet differs according to area.

AC power supply cord ([3])

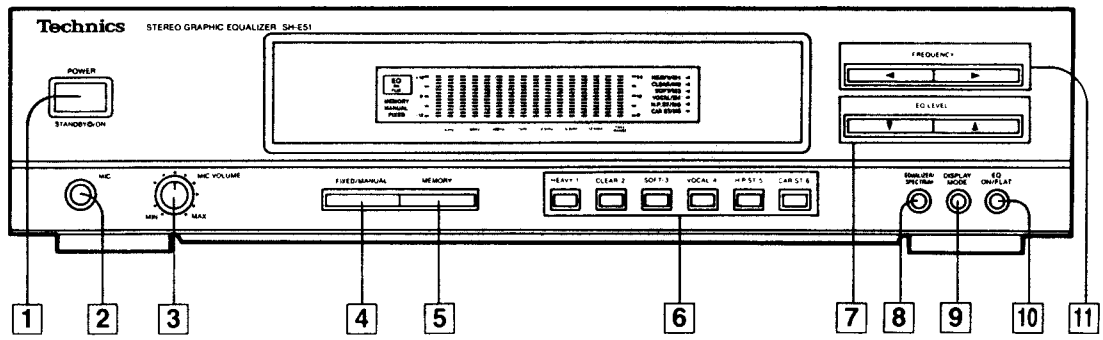
To the AC outlet of the audio equipment, or household AC outlet.
Notes:
- The configuration of AC power supply cord differs according to area.
- Connect this cord only after all other cables and cords have been connected.



To the "SYSTEM CONTROL OUT" terminal of a compact disc player
Note:
If the compact disc player is not used in combination with your components, connect the L-type cable of this unit to the "SYSTEM CONTROL OUT" terminal of a cassette deck.

To the "AC OUTLET" of a compact disc player
Note:
If the compact disc player is not used in combination with your components, connect the AC power supply cord of this unit to the "AC OUTLET" of the amplifier.

■ FRONT PANEL CONTROLS AND FUNCTIONS



Control section

[1] Power "STANDBY ⏻/ON" switch (POWER STANDBY ⏻ /ON)

This switch switches ON and OFF the secondary circuit power only. The unit is in the "standby" condition when this switch is set to the STANDBY ⏻ position. Regardless of the switch setting, the primary circuit is always "live" as long as the power cord is connected to an electrical outlet.

Note:

- For this unit, even if this switch is switched to the "STANDBY" position, there is still a slight power consumption of about 5.7 watts; this is in order to assure the retention of the "most recent" memory and the preset-memory functions.

"Power-through" function

Discs, radio broadcasts, etc. can be heard even if the power of this unit is switched to STANDBY.
Note, however, that the power plug should be left connected to the AC outlet.

[2] Microhone jack (MIC)

[3] Microphone volume control (MIC VOLUME)

[4] Memory mode-select button (FIXED/MANUAL)

This button is used to select the equalization memory mode to be used.

FIXED: Select this mode to retrieve a curve that was originally pre-programmed to the unit's memory.

MANUAL: Select this mode to program a desired curve to the unit's memory or to retrieve a curve that you have programmed.

[5] Memory button (MEMORY)

This button is used to program the equalization curve into the memory.

[6] Preset-memory buttons (HEAVY·CAR ST, M1–M6)

These buttons are used to program an equalization curve into the memory, or to retrieve a curve originally programmed into the unit's memory of a curve that you have programmed into the memory.

[7] Equalizer level-control buttons (EQ LEVEL)

These buttons are used for adjustment of the equalization level of the left channel and right channel simultaneously.

[8] Equalization-level/spectrum mode-select button (EQUALIZER/SPECTRUM)

This button is used to select the equalization-level display mode and the spectrum display mode.

[9] Display mode-select button (DISPLAY MODE)

The display mode changes each time this button is pressed. The unit can be set to any of the five spectrum display modes.

[10] Equalization mode-select button (EQ ON/FLAT)

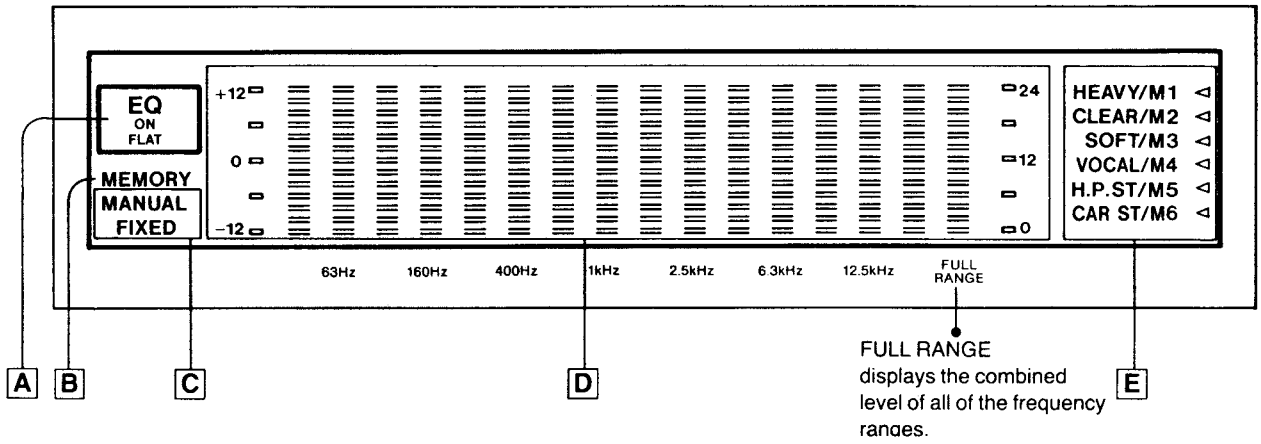
This button is used to switch the equalization correction function "EQ ON" and "FLAT".

EQ ON: Select this mode to make an equalization correction.

FLAT: Select this mode if no equalization correction is desired.

[11] Frequency band selector buttons (FREQUENCY)

Use these buttons to select the frequency band to be adjusted.



Display section

A Equalization-mode indicators

EQ ON: Indicates that the equalization effect has been switched ON.

FLAT: Indicates that the equalization effect has been switched FLAT.

B Equalization-memory indicator

This indicator illuminates when the memory button is pressed, thus indicating that an equalization curve can be programmed into the memory.

C Memory-mode indicators

FIXED: Indicates that one of the equalization curves that were originally programmed into the memory can be retrieved.

MANUAL: Indicates that an equalization curve that you programmed into the memory can be retrieved.

D Equalization/Spectrum display

The following equalization-level display and five types of spectrum display are possible.

■ Equalization-level display

The amout of correction is displayed by a series of lines (=) for each sound range (frequency range).

■ Spectrum display

The unit has five built-in display modes.

Note:

If an equalization level-control or the memory-mode selector or a preset-memory button is pressed during any display other than the equalization-level display, the equalization-level display will be shown for about three seconds, after which the former display will return.

E Equalization-preset indicators

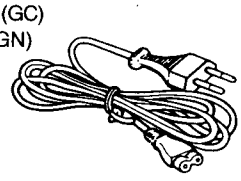
These indicators show which of the six FIXED or six MANUAL equalization curves is currently is use.

HEAVY-CAR ST: Indicates one of the equalization curves that were originally programmed into the memory.

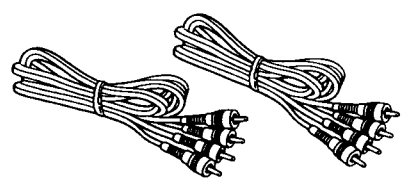
M1–M6: Indicates an equalization curve that you programmed into the memory.

■ ACCESSORIES

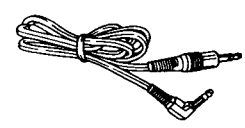
- AC power supply cord ..... 1 pc.
  SJA187 (E, EG)
  SJA188 (EB)
  RJA0004 (GC)
  SJA173 (GN)



- Stereo connection cables ..... 2 pcs.
  (SJP2249-3)



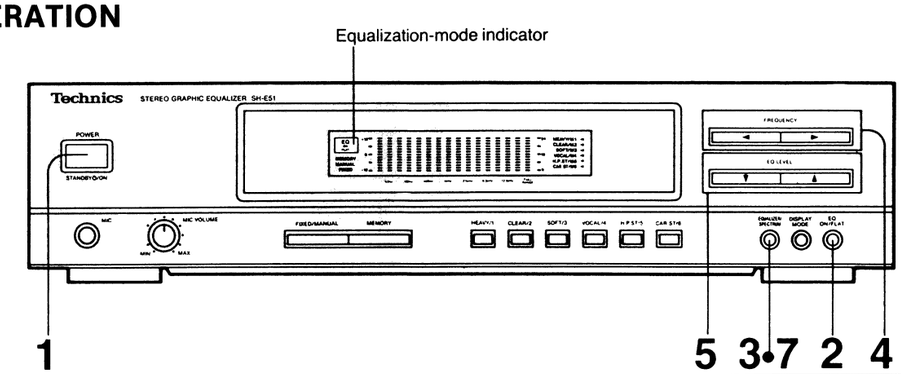
- L-type cable ..... 1 pc.
  (SJP2257T)



- AC plug adaptor ..... 1 pc.
  (SJP9215) For (GC) only.

Note: The configuration of AC power supply cord differs according to area.

■ OPERATION



To adjust to the desired tone quality

1 **Switch ON the power.**

2 **Switch ON the equalization mode-select button.**
(The "EQ ON" equalization-mode indicator will illuminate.)

3 **Press the equalization level/spectrum mode-select button to select the equalizer display.**

4 **Select the frequency band to be adjusted using the frequency band selector buttons.**
The bar (lighted dots) on the equalizer display flashes on and off indicating that the band can be adjusted.

■ Characteristics of the different frequency bands

63 Hz:	The deep bass range
160 Hz:	The bass range
400 Hz:	The fundamental tonal range of music
1 kHz:	The tonal range which adds tension to the sound
2.5 kHz:	The tonal range where strings and winds are most prominent
6.3 kHz:	The tonal range which adds gloss to the sound
12.5 kHz:	The tonal range which adds glitter to the sound

5 **Adjust the equalization level of the frequency band using the equalization level-control buttons.**
When the equalizer level-control button corresponding to the frequency to be adjusted is pressed, the equalization level changes in 2 dB steps.

6 **Repeat steps 4 and 5 above to adjust to the desired sound.**

7 **Press the equalization level/spectrum mode-select button to select the spectrum display.**
After adjustments have been completed, press the display mode-select button to select the desired display from among the following: BAR-TYPE, PEAK-HOLD, DOT, HUSTLER and AURORA.

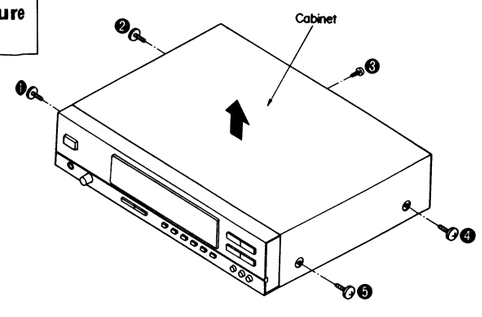
Notes:
- To listen or record without the equalization effect, either press the equalization mode-select button (to the "FLAT" setting).
- Do not attempt to adjust the equalization level during recording.
- To listen the tape with the equalization effect, press the equalization mode-select button (to the "FLAT" setting).

■ DISASSEMBLY INSTRUCTIONS

"ATTENTION SERVICER"
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

Ref. No. 1 — Removal of the cabinet

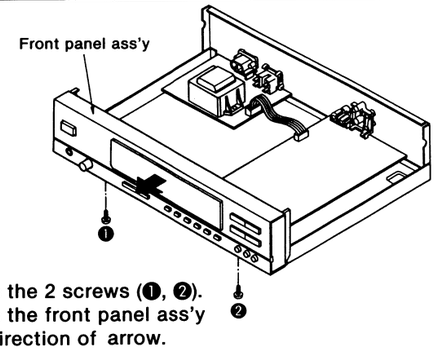
Procedure 1



- Remove the 5 screws (❶~❺).

Ref. No. 2 — Removal of the front panel ass'y

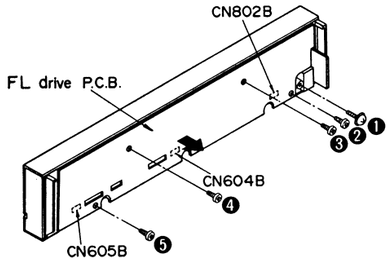
Procedure 1→2



1. Remove the 2 screws (❶, ❷).
2. Remove the front panel ass'y in the direction of arrow.

Ref. No. 3 — Removal of the FL drive P.C.B.

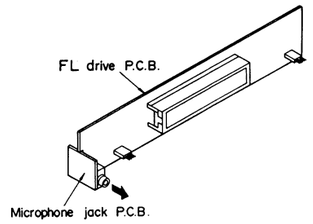
Procedure 1→2→3



1. Remove the 5 screws (❶~❺).
2. Remove the FL drive P.C.B. in the direction of arrow.
3. Remove the P.C.B. in the direction of arrow, making sure not to damage the connectors (CN604B, CN605B and CN802B).

Ref. No. 4 — Removal of the microphone jack P.C.B.

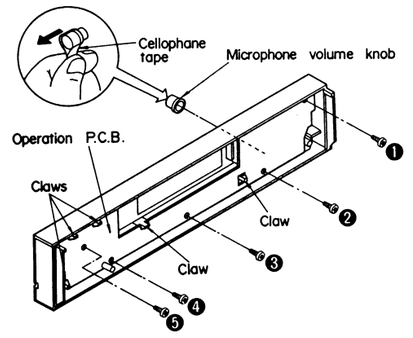
Procedure 1→2→3→4



- Remove the microphone jack P.C.B. in the direction of arrow.

Ref. No. 5 — Removal of the operation P.C.B.

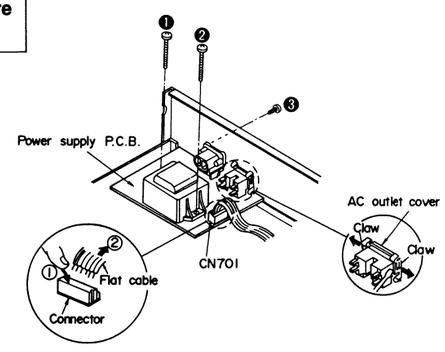
Procedure 1→2→3→5



1. Pull out the microphone volume knob.
2. Remove the 5 screws (❶~❺).
3. Release the 5 claws.

Ref. No. 6 — Removal of the power supply P.C.B.

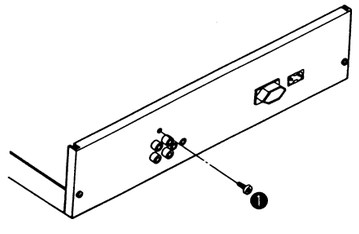
Procedure 1→6



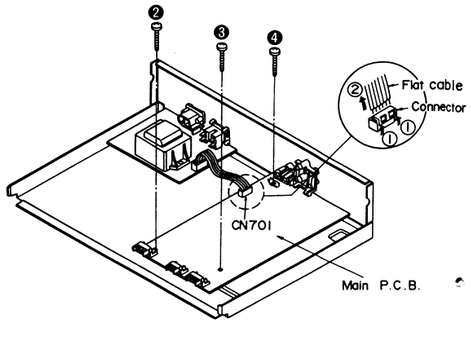
1. Remove the 1 flat cable (CN701).
2. Remove the 3 screws (❶~❸).
3. Release the 2 claws of AC outlet cover.

Ref. No. 7 — Removal of the main P.C.B.

Procedure 1→2→7



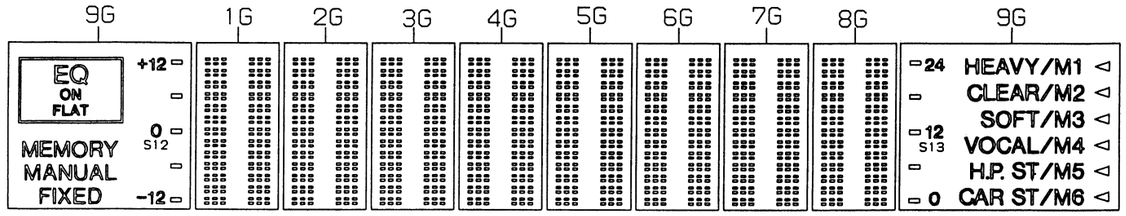
1. Remove the 1 screw (❶).



2. Remove the 1 flat cable (CN701).
3. Remove the 3 screws (❷~❹).

■ INTERNAL CONNECTION OF FL

• Grid connection diagram



• Anode connection table

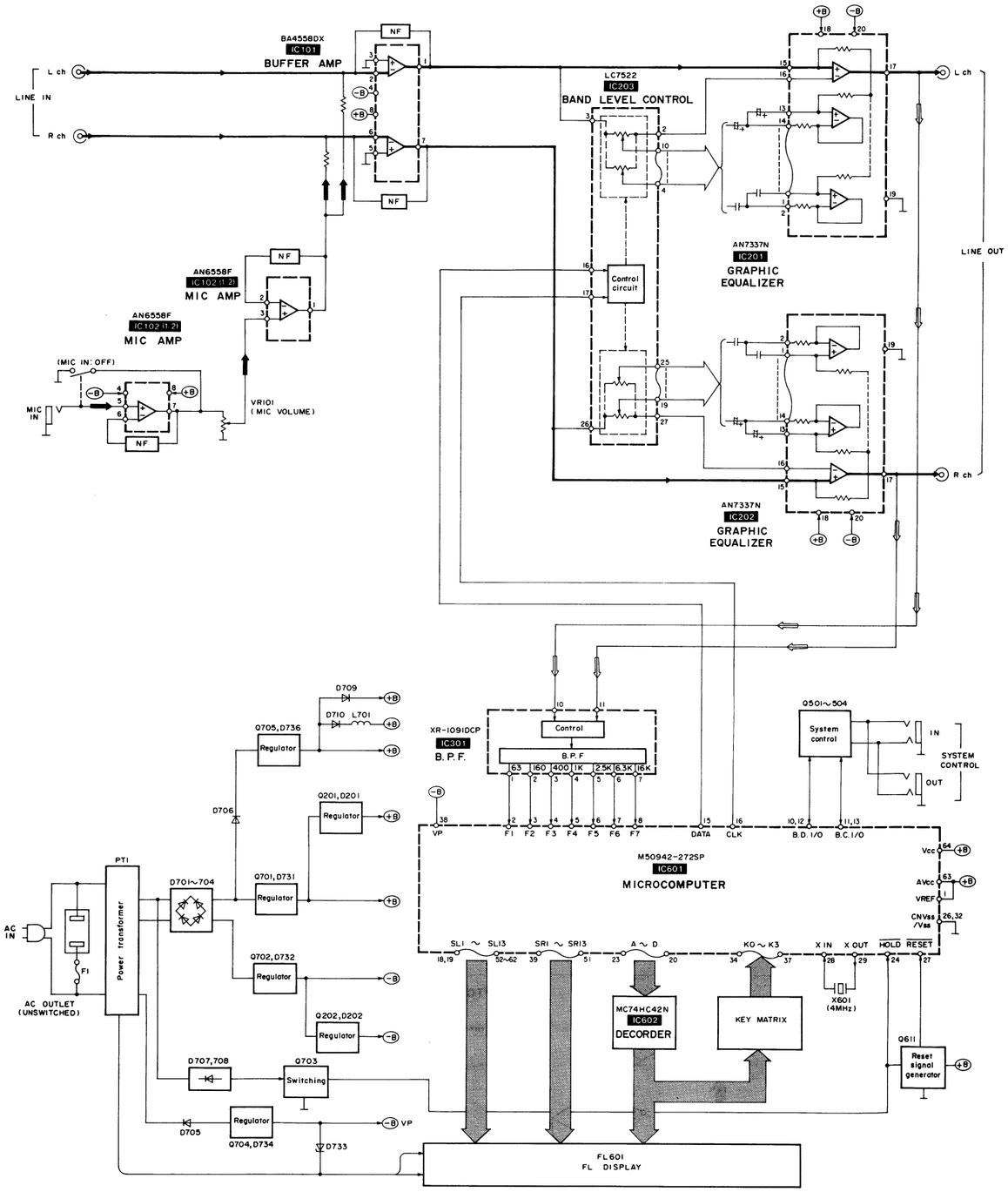
	9G	8G	7G	6G	5G	4G	3G	2G	1G
P1	◁(M6)	B1	B1	B1	B1	B1	B1	B1	B1
P2	◁(M5)	B2	B2	B2	B2	B2	B2	B2	B2
P3	◁(M4)	B3	B3	B3	B3	B3	B3	B3	B3
P4	◁(M3)	B4	B4	B4	B4	B4	B4	B4	B4
P5	◁(M2)	B5	B5	B5	B5	B5	B5	B5	B5
P6	◁(M1)	B6	B6	B6	B6	B6	B6	B6	B6
P7	FIXED	B7	B7	B7	B7	B7	B7	B7	B7
P8	MANUAL	B8	B8	B8	B8	B8	B8	B8	B8
P9	MEMORY	B9	B9	B9	B9	B9	B9	B9	B9
P10	FLAT	B10	B10	B10	B10	B10	B10	B10	B10
P11	ON	B11	B11	B11	B11	B11	B11	B11	B11
P12	S12	B12	B12	B12	B12	B12	B12	B12	B12
P13	S13	B13	B13	B13	B13	B13	B13	B13	B13
P14	-	B14	B14	B14	B14	B14	B14	B14	B14
P15	-	B15	B15	B15	B15	B15	B15	B15	B15
P16	-	B16	B16	B16	B16	B16	B16	B16	B16
P17	-	B17	B17	B17	B17	B17	B17	B17	B17
P18	-	B18	B18	B18	B18	B18	B18	B18	B18
P19	-	B19	B19	B19	B19	B19	B19	B19	B19
P20	-	B20	B20	B20	B20	B20	B20	B20	B20
P21	-	B21	B21	B21	B21	B21	B21	B21	B21
P22	-	B22	B22	B22	B22	B22	B22	B22	B22
P23	-	B23	B23	B23	B23	B23	B23	B23	B23
P24	-	B24	B24	B24	B24	B24	B24	B24	B24
P25	-	B25	B25	B25	B25	B25	B25	B25	B25
P26	-	B26	B26	B26	B26	B26	B26	B26	B26
P27	S27	-	-	-	-	-	-	-	-

• Pin connection

PIN NO.	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
CONNECTION	F2	F2	P	N	P	G	1	2	3	4	5	6	7	8	9	G	P	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	C	3	2	1	0	9	8	7	6	5	4	3	2	1	P	7	N	P	2	N	P	F1	F1

NOTE 1) F1,F2 --- Filament
2) NP ------ No pin
3) 1G~9G --- Grid

■ BLOCK DIAGRAM



Note:

→ : Source signal
⇨ : Spectrum analyzer signal
➡ : Mic signal

■ SCHEMATIC DIAGRAM

(Parts list on pages 20~22.)

(This schematic diagram may be modified at any time with development of new technology.)

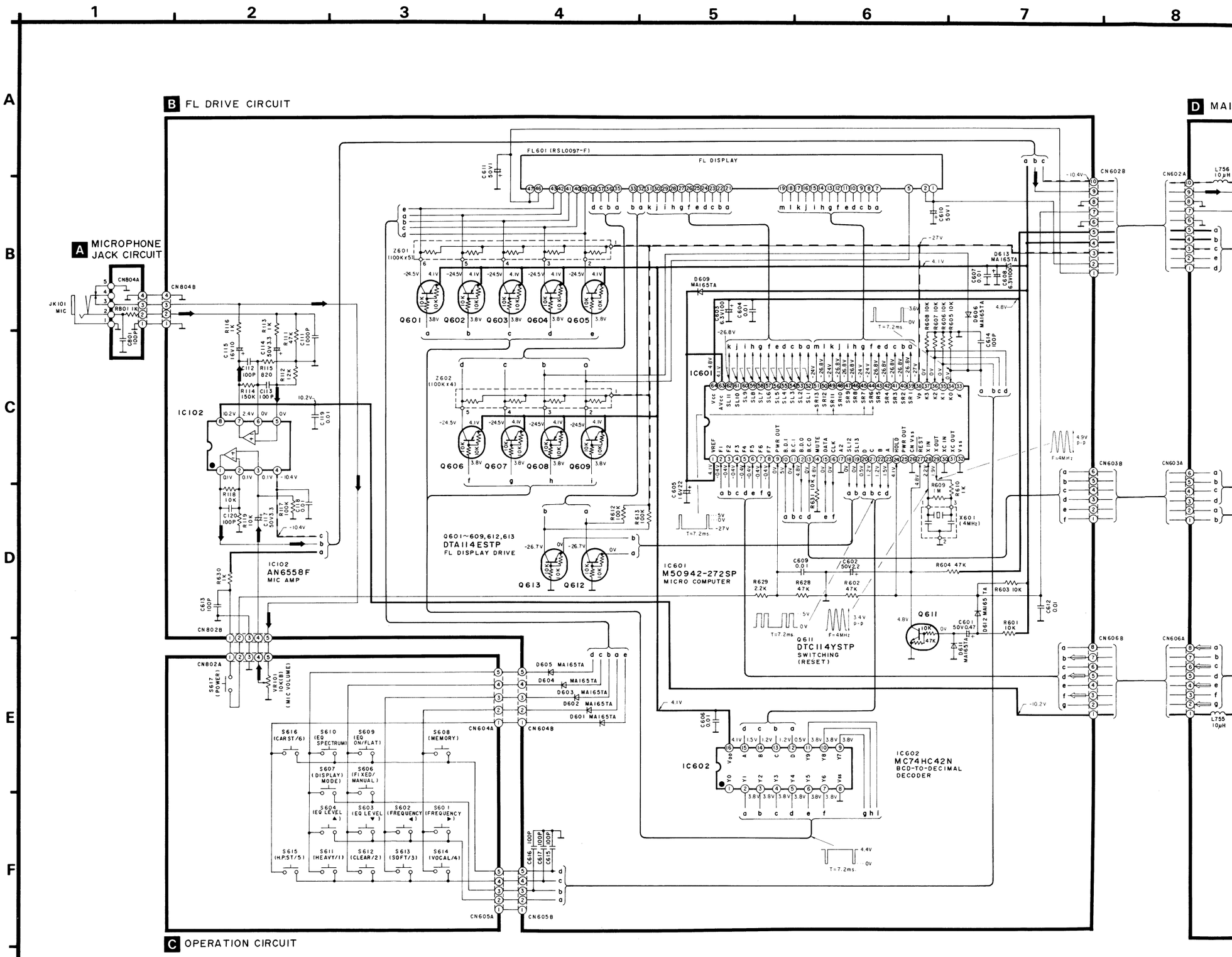
Notes:

- **S601, 602** : Frequency band selector (FREQUENCY) switches. [S601: ◀, S602: ▶]
- **S603, 604** : Equalizer level-control (EQ LEVEL) switches. [S603: ▼, S604: ▲]
- **S606** : Memory mode-select (FIXED/MANUAL) switch.
- **S607** : Display mode-select (DISPLAY MODE) switch.
- **S608** : Memory (EQ MEMORY) switch.
- **S609** : Equalization mode-select (EQUALIZER-ON/FLAT) switch.
- **S610** : Equalization-level/spectrum mode-select (EQUALIZER/SPECTRUM) switch.
- **S611~S616** : Preset-memory (HEAVY-CAR ST, M1-M6) switches.
- **S617** : Power "STANDBY ⏻ /ON" (POWER STANDBY ⏻ /ON) switch.
- **S701** : Voltage selector switch (Voltage selector) in "**240V**"position. (110V←127V←220V←240V) (GC) area only.
- The voltage value and waveforms are the reference voltage of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Accordingly, there may arise some error in voltage values and waveforms depending upon the internal impedance of the tester or the measuring unit.
- Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- ▬▬ / ▬ ▬ ▬ : Positive voltage lines and negative voltage lines.
  ▒▒▒ : Source signal
  ▭▭▭ : Spectrum analyzer signal
  ▬▬▶ : Mic signal

Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

- Cover the parts boxes made of plastics with aluminum foil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the pins of IC or LSI with fingers directly.



7 8 9 10 11 12 13 14 15 16 17

D MAIN CIRCUIT

IC201,202
AN7337N
GRAPHIC EQUALIZER AMP

IC101
BA4558DX
BUFFER AMP

IC203
LC7522
BAND LEVEL CONTROL

IC301
XR-1091DCP
SPECTRUM ANALYZER B.P. FILTER

Q201
2SC3311AQSTA
REGULATOR

Q202
2SA1309AQSTA
REGULATOR

Q703
2SC3311AQSTA
POWER DOWN DET.

Q705
2SD2037DEFTA
REGULATOR

Q704
2SB621AQRSTA
REGULATOR

Q503,504
2SC3311AQSTA
SWITCHING (SYSTEM CONT.)

Q501,502
DTC144ESTP
SWITCHING (SYSTEM CONT.)

Q701
KSD471ACYGTA
REGULATOR

Q702
KSB564ACYGTA
REGULATOR

D701~704
ISR35200TB

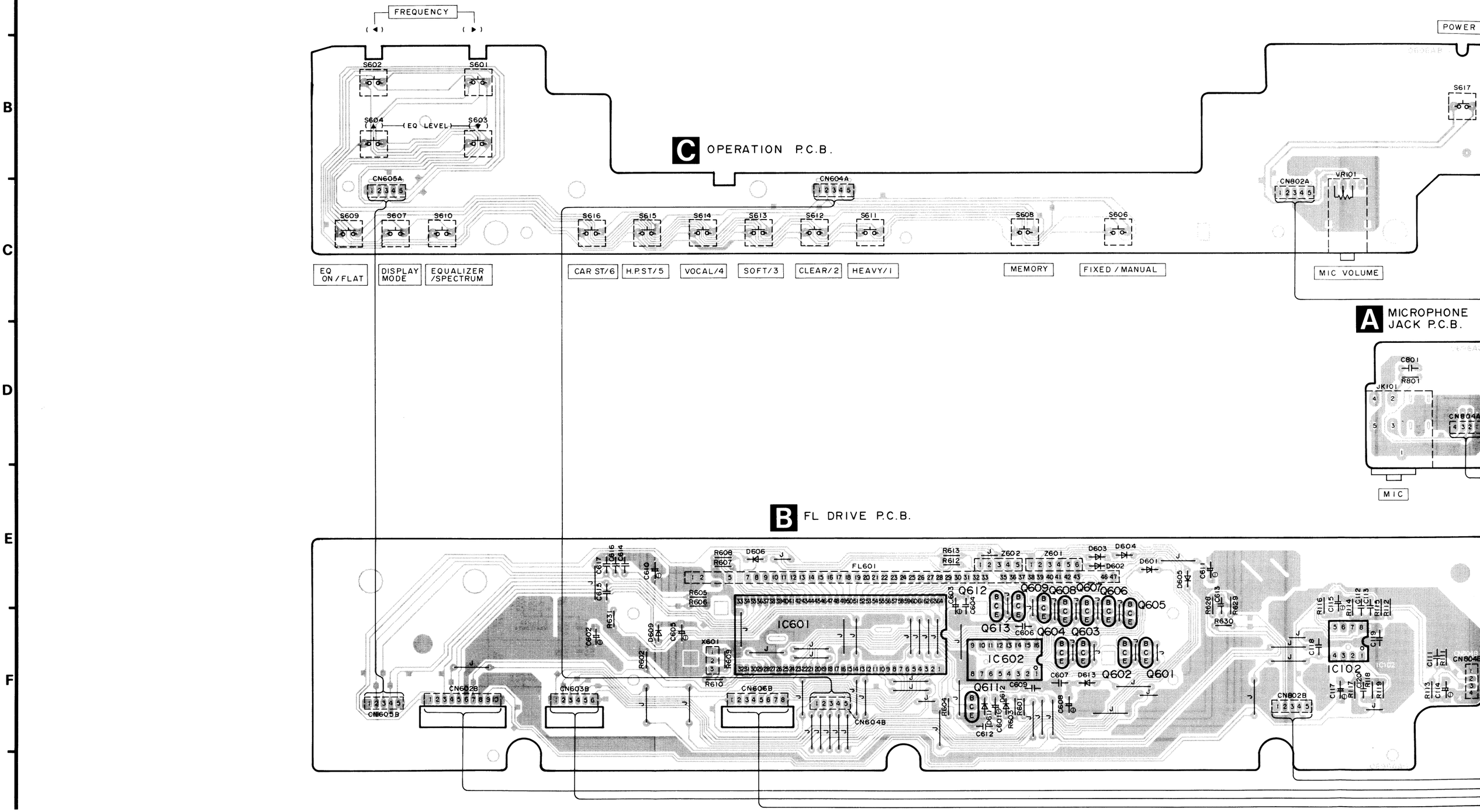
L ch
R ch
LINE IN
LINE OUT
JK1
JK602 IN
SYSTEM CONTROL
JK601 OUT

E POWER SUPPLY CIRCUIT For(GC)area.

E POWER SUPPLY CIRCUIT
For(E,EB,EG,GN)areas.

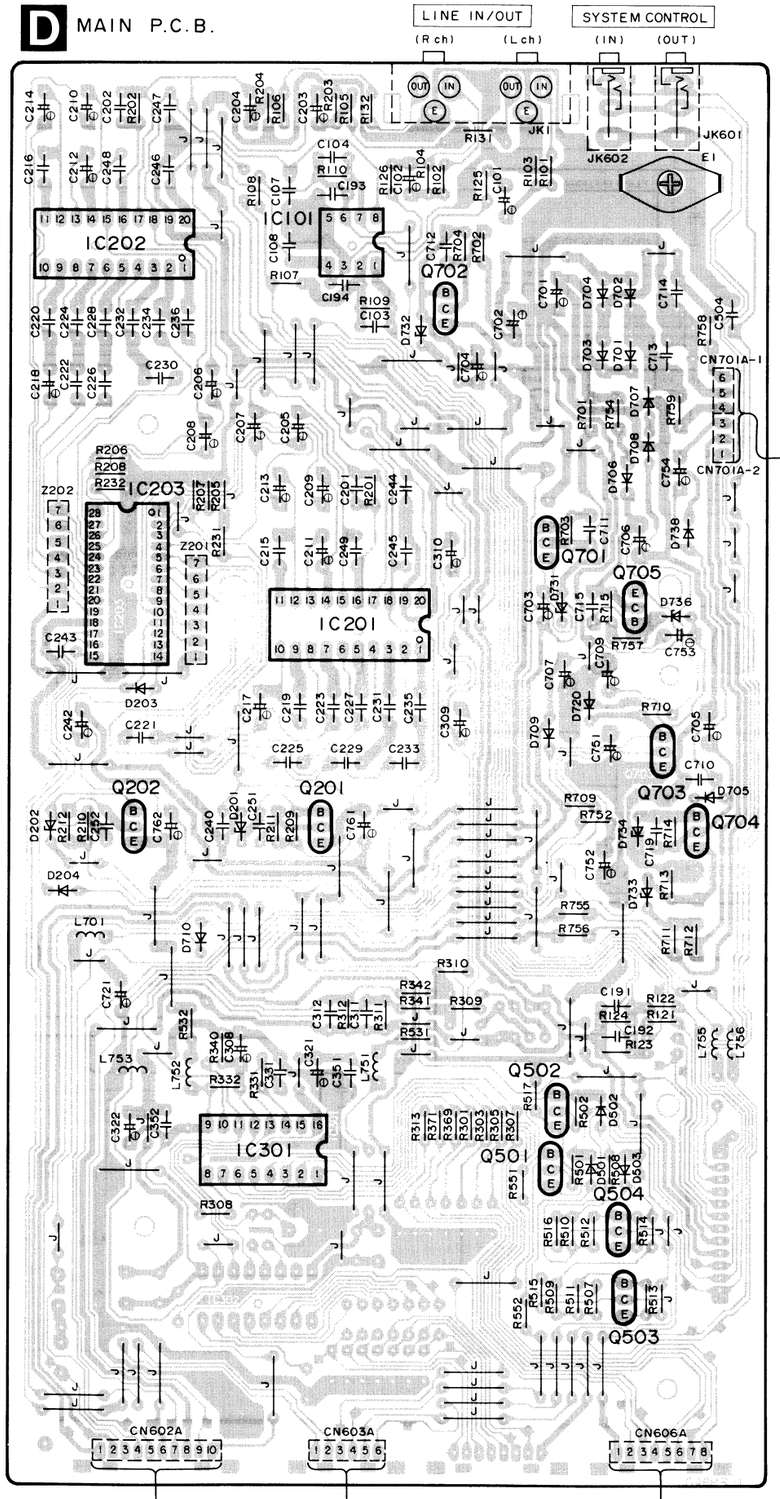
AC 110/127/220/240V (50/60Hz)
AC 230~240V (50/60Hz)
AC OUTLET (UNSWITCHED)

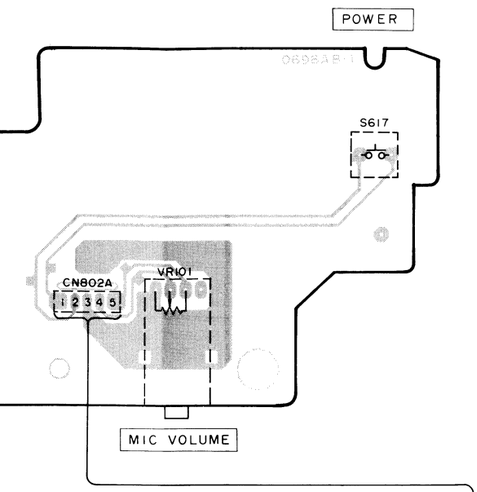
■ PRINTED CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM



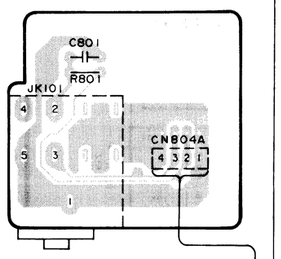
10 11 12 13 14 15 16 17 18 19

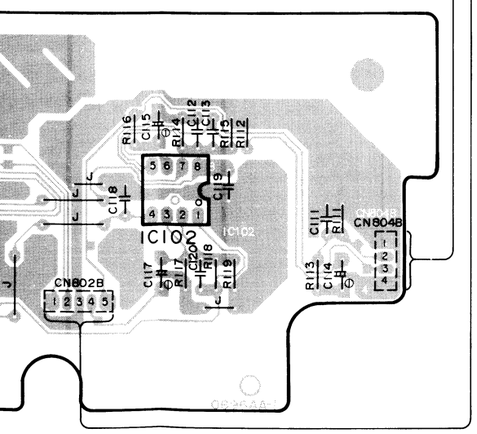
D MAIN P.C.B.

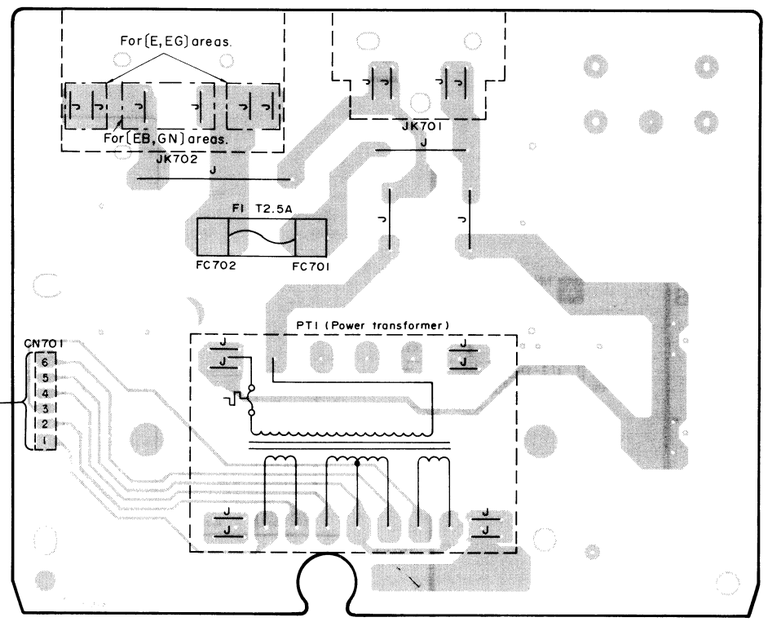




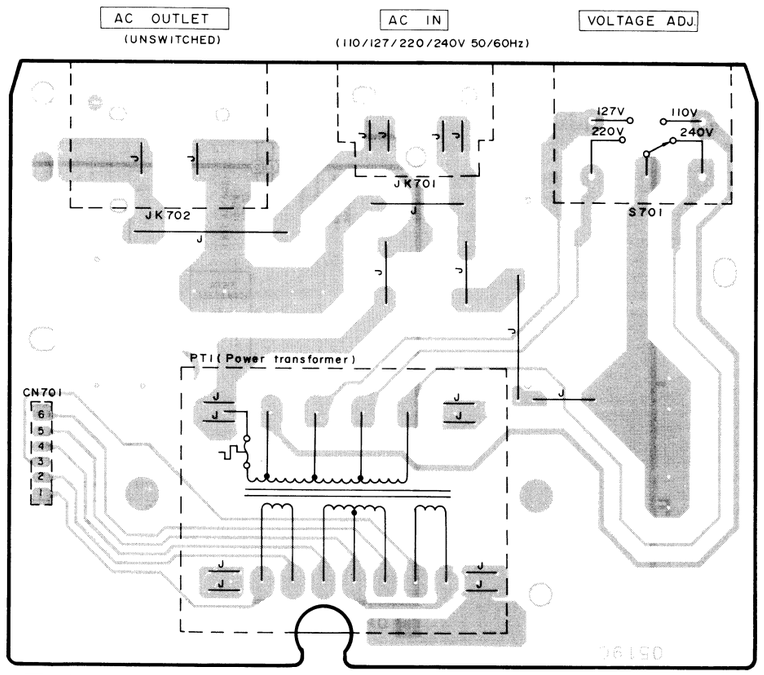
A MICROPHONE JACK P.C.B.





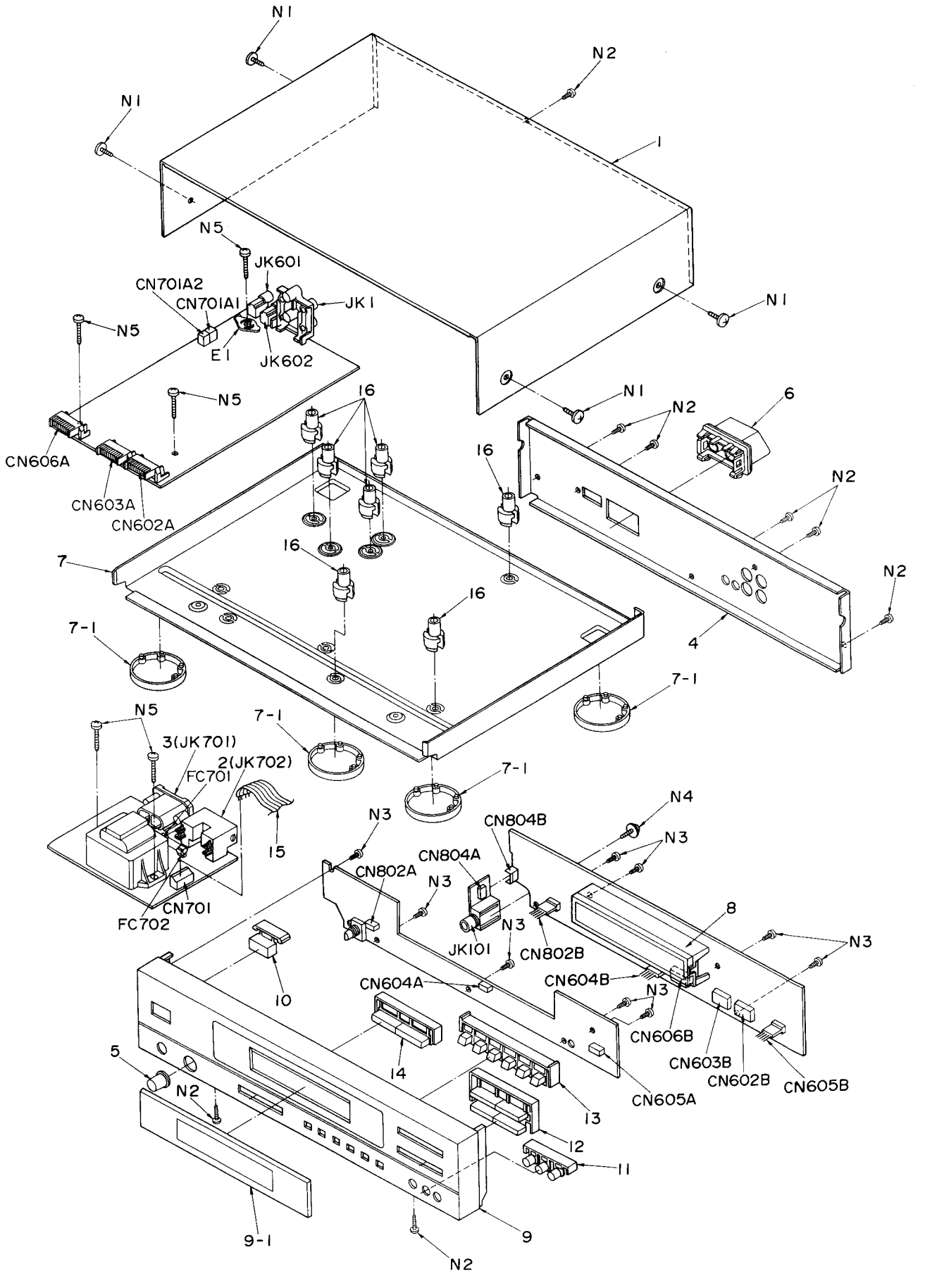


E POWER SUPPLY P.C.B. For[E,EB,EG,GN]areas.



E POWER SUPPLY P.C.B For[GC]area.

■ EXPLODED VIEWS



■ TERMINAL FUNCTION OF IC

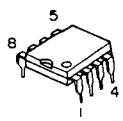
• IC601 (M50942-272SP): Microcomputer

Pin No.	Mark	I/O Division	Function
1	VREF	I	Referenc'e voltage terminal for A/D converter
2	F1	I	Spectrum analyzer signal
3	F2		
4	F3		
5	F4		
6	F5		
7	F6		
8	F7		
9	PWR OUT	I	Power ON/OFF detector terminal
10	B.D.I	I	External control data signal
11	B.C.I	I	External control clock signal
12	B.D.O	O	External control data signal
13	B.C.O	O	External control clock signal
14	MUTE	O	Muting signal (Not used, connected resister)
15	DATA	O	Serial data signal
16	CLK	O	Clock signal
17	A2	—	GND terminal
18	SL12	O	Segment signal for FL display
19	SL13		
20	D	O	Digit signal for FL display
21	C		
22	B		
23	A		

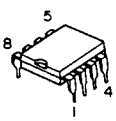
Pin No.	Mark	I/O Division	Function
24	$\overline{HOLD}$	I	Power down mode detector terminal
25	PWR OUT	O	Power ON/OFF detector signal
26	CNVSS	—	GND terminal
27	$\overline{RESET}$	I	Reset signal
28	X IN	I	Crystal osc terminal (4MHz)
29	X OUT	O	
30	XC IN	—	Not used, connected to GND
31	XC OUT	—	Not used, open
32	VSS	—	GND terminal
33	φ	—	Non connection
34 ∫ 37	K0 ∫ K3	I	Key scan signal
38	VP	I	Power supply terminal for FL drive
39 ∫ 51	SR1 ∫ SR13	O	Segment signal for FL display
52 ∫ 62	SL1 ∫ SL11		
63	AVCC	I	Power supply terminal
64	VCC	I	Power supply terminal

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

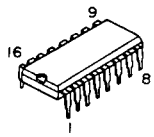
AN6558F



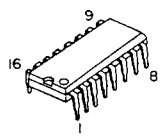
BA4558DX



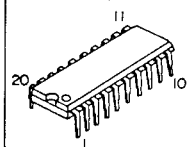
XR-1091DCP



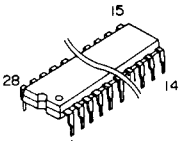
MC74HC42N



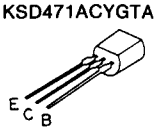
AN7337N



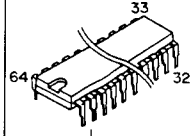
LC7522



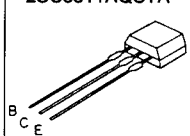
2SB621AQRSTA
KSB564ACYGTA
KSD471ACYGTA

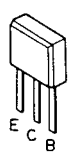


M50942-272SP



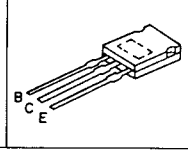
2SA1309AQSTA
2SC3311AQSTA

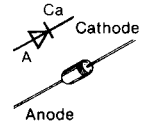




DTA114ESTP
DTC114YSTP
DTC144EKT96

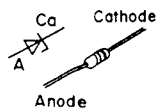
2SD2037DEFTA



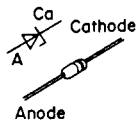


MA165TA
MA167TA
MA700TA
1SR35200TB
1SS291TA

MA4056MTA
MA4062MTA
MA4068MTA



MA4110MTA
MA4270MTA



Notes : * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC101	BA4558DX	IC, BUFFER AMP	
IC102	AN6558F	IC, MIC AMP	
IC201, 202	AN7337N	IC, GRAPHIC EQUALIZER AMP	
IC203	LC7522	IC, BAND LEVEL CONTROL	
IC301	XR-1091DCP	IC, SPECTRUM ANALYZER B. P. F.	
IC601	M50942-272SP	IC, MICROCOMPUTER	
IC602	MC74HC42N	IC, B/D DECODER	
		TRANSISTOR(S)	
Q201	2SC3311A-Q	TRANSISTOR	
Q202	2SA1309A-R	TRANSISTOR	
Q501, 502	DTC144EKT96	TRANSISTOR	
Q503, 504	2SC3311A-Q	TRANSISTOR	
Q601-609	DTA114ESTP	TRANSISTOR	
Q611	DTC114YSTP	TRANSISTOR	
Q612, 613	DTA114ESTP	TRANSISTOR	
Q701	KSD471ACYGTA	TRANSISTOR	
Q702	KSB564ACYGTA	TRANSISTOR	
Q703	2SC3311A-Q	TRANSISTOR	
Q704	2SB621A-R	TRANSISTOR	
Q705	2SD2037DEFTA	TRANSISTOR	
		DIODE(S)	
D201, 202	MA4068M	DIODE	
D203, 204	MA165	DIODE	
D501, 502	MA700TA	DIODE	
D503	MA165	DIODE	
D601-606	MA165	DIODE	
D609	MA165	DIODE	
D611-613	MA165	DIODE	
D701-704	1SR35200TB	DIODE	⚠
D705	MA167	DIODE	⚠
D706	1SR35200TB	DIODE	⚠
D707, 708	MA165	DIODE	
D709	1SS291TA	DIODE	
D710	MA165	DIODE	
D720	MA165	DIODE	
D731, 732	MA4110MTA	DIODE	
D733	MA4056MTA	DIODE	
D734	MA4270	DIODE	
D736	MA4062MTA	DIODE	
D738	MA167	DIODE	

Ref. No.	Part No.	Part Name & Description	Remarks
		VARIABLE RESISTOR(S)	
VR101	EVJ02BF01B14	V. R, MIC VOLUME	
		COMPONENT COMBINATION(S)	
Z201, 202	EXBF7E224JYV	COMPONENT COMBINATION	
Z601	EXBF6E104JYV	COMPONENT COMBINATION	
Z602	EXBF5E104JYV	COMPONENT COMBINATION	
		COIL(S)	
L701	ELEXT101KA9	COIL	
L751-753	ELEXT4R7KA9	COIL	
L755, 756	ELEXT100KA9	COIL	
		OSCILLATOR(S)	
X601	EFOGC4004A4	OSCILLATOR, 4MHZ	
		DISPLAY TUBE	
FL601	RSL0097-F	DISPLAY TUBE	
		FUSE	
F1	XBA2C25TB0	FUSE, 250V 2. 5A	(E, EB, EG, GN) ⚠
		SWITCH(ES)	
S601	EVQ21405R	SW, FREQUENCY(DOWN)	
S602	EVQ21405R	SW, FREQUENCY(UP)	
S603	EVQ21405R	SW, EQ LEVEL(DOWN)	
S604	EVQ21405R	SW, EQ LEVEL(UP)	
S606	EVQ21405R	SW, FIXED/MANUAL	
S607	EVQ21405R	SW, DISPLAY MODE	
S608	EVQ21405R	SW, MEMORY	
S609	EVQ21405R	SW, EQ ON/FLAT	
S610	EVQ21405R	SW, EQUALIZER/SPECTRUM	
S611	EVQ21405R	SW, HEAVY/1	
S612	EVQ21405R	SW, CLEAR/2	
S613	EVQ21405R	SW, SOFT/3	
S614	EVQ21405R	SW, VOCAL/4	
S615	EVQ21405R	SW, HP ST/5	
S616	EVQ21405R	SW, CAR ST/6	
S617	EVQ21405R	SW, POWER	

■ REPLACEMENT PARTS LIST

Notes : * Important safety notice:
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Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RKMD139-K	CABINET	
2	RJS1A4802-B	AC OUTLET (JK702)	(EB) ⚠
2	SJS9331B	AC OUTLET (JK702)	(GC) ⚠
2	RJS1A8102	AC OUTLET (JK702)	(GN) ⚠
2	RJS1A4902-B	AC OUTLET (JK702)	(E, EG) ⚠
3	SJSD16	AC INLET (JK701)	(GN) ⚠
3	SJS9236	AC INLET (JK701)	(E, EB, EG, GC) ⚠
4	RGR0098N-A	REAR PANEL	(EB)
4	RGR0098P-B	REAR PANEL	(EG)
4	RGR0098Q-A	REAR PANEL	(GC)
4	RGR0098R-A	REAR PANEL	(GN)
4	RGR0098P-A	REAR PANEL	(E)
5	RGW0055	KNOB, MIC VOLUME	
6	RJS1A4802-A	AC OUTLET COVER	(EB)
6	SJS9331A	AC OUTLET COVER	(GC)
6	RJS1A4602	AC OUTLET COVER	(GN)
6	RJS1A4902-A	AC OUTLET COVER	(E, EG)
7	RFKJTX302LEK	SHASSIS ASS'Y	
7-1	RKA0011-2	FOOT	
8	RMN0100	FL HOLDER	
9	RFKGHE51E-K	FRONT PANEL ASS'Y	
9-1	RKW0163-K	FL FILTER	
10	RGU0453-K	BUTTON, POWER	
11	RGU0455-K	BUTTON, EQUALIZER	
12	RGU0589-K	BUTTON, CONTROL	
13	RGU0590B-K	BUTTON, GE FUNCTION	
14	RGU0591A-K	BUTTON, MEMORY	
15	RWJ1806130QQ	FLAT CABLE (6P)	
16	SHE187-2	P. C. B. SUPPORT	
		SCREWS	
N1	RHD30007	SCREW	
N2	XTBS3+8JFZ1	SCREW	
N3	XTBS26+8J	SCREW	
N4	XTWS3+8T	SCREW	
N5	XTB3+20JFZ	SCREW	
		PACKING MATERIAL	
P1	RPG0851	PACKING CASE	
P2	RPN0413-1	PAD	
P3	SPSD152	ACCESSORIES BOX	
P4	SPP753	POTECTION BAG (UNIT)	
P5	SPB1061	PROTECTION BAG (F. B.)	
		ACCESSORIES	
A1	RFKSHE51E-K	INST. MANUAL ASS'Y	(E)
A1	RQT0959-B	INSTRUCTION MANUAL	(EB, GN)
A1	RQT0960-D	INSTRUCTION MANUAL	(EG)
A1	RQT0957-G	INSTRUCTION MANUAL	(GC)
A2	RQA0013	WARRANTY CARD	(E, EB, EG)
A2	SQX7186	WARRANTY CARD	(GN)
A3	RQCB0169	SERVICENTER LIST	
A4	SJA187	AC POWER SUPPLY CORD	(E, EG) ⚠
A4	SJA188	AC POWER SUPPLY CORD	(EB) ⚠
A4	RJA0004	AC POWER SUPPLY CORD	(GC) ⚠
A4	SJA173	AC POWER SUPPLY CORD	(GN) ⚠
A5	SJP2249-3	STEREO CONNECTION CABLE	
A6	SJP2257T	L-TYPE CABLE	
A7	SJP9215	AC PLUG ADAPTOR	(GC) ⚠

■ RESISTORS & CAPACITORS

Notes : * Capacity valuse are in microfarads (uF) unless specified otherwise, P=Pico-farads(pF) F=Farads(F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000(OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R101, 102	ERDS2TJ102	1/4W 1K
R103, 104	ERDS2TJ104	1/4W 100K
R105, 106	ERDS2TJ102	1/4W 1K
R107, 108	ERDS2TJ393	1/4W 39K
R109, 110	ERDS2TJ223	1/4W 22K
R111	ERDS2TJ473	1/4W 47K
R112	ERDS2TJ123	1/4W 12K
R113	ERDS2TJ102	1/4W 1K
R114	ERDS2TJ154	1/4W 150K
R115	ERDS2TJ821	1/4W 820
R116	ERDS2TJ102	1/4W 1K
R117	ERDS2TJ104	1/4W 100K
R118, 119	ERDS2TJ103	1/4W 10K
R121, 122	ERDS2TJ153	1/4W 15K
R123-126	ERDS2TJ223	1/4W 22K
R131, 132	ERDS2TJ102	1/4W 1K
R201, 202	ERDS2TJ153	1/4W 15K
R203, 204	ERDS2TJ104	1/4W 100K
R205, 206	ERDS2TJ123	1/4W 12K
R207, 208	ERDS2TJ224T	1/4W 220K
R209, 210	ERDS2TJ222	1/4W 2.2K
R211, 212	ERD25FJ101	1/4W 100 ⚠
R231, 232	ERDS2TJ224T	1/4W 220K
R301	ERDS2TJ122	1/4W 1.2K
R303	ERDS2TJ122	1/4W 1.2K
R305	ERDS2TJ122	1/4W 1.2K
R307	ERDS2TJ122	1/4W 1.2K
R308	ERDS2TJ104	1/4W 100K
R309, 310	ERDS2TJ472	1/4W 4.7K
R311, 312	ERDS2TJ103	1/4W 10K
R313	ERDS2TJ122	1/4W 1.2K
R331	ERDS2TJ152	1/4W 1.5K
R332	ERDS2TJ103	1/4W 10K
R340	ERDS2TJ471	1/4W 470
R341, 342	ERDS2TJ823T	1/4W 82K
R369	ERDS2TJ122	1/4W 1.2K
R371	ERDS2TJ122	1/4W 1.2K
R501, 502	ERDS2TJ100	1/4W 10
R507, 508	ERDS2TJ100	1/4W 10
R509-514	ERDS2TJ393	1/4W 39K
R515, 516	ERDS2TJ223	1/4W 22K
R517	ERDS2TJ100	1/4W 10
R531, 532	ERDS2TJ220T	1/4W 22
R551, 552	ERDS2TJ102	1/4W 1K
R601	ERDS2TJ103	1/4W 10K
R602	ERDS2TJ473	1/4W 47K
R603	ERDS2TJ103	1/4W 10K
R604	ERDS2TJ473	1/4W 47K
R605-608	ERDS2TJ103	1/4W 10K
R609	ERDS2TJ105T	1/4W 1M
R610	ERDS2TJ102	1/4W 1K
R612, 613	ERDS2TJ104	1/4W 100K
R628	ERDS2TJ473	1/4W 47K
R629	ERDS2TJ222	1/4W 2.2K
R630	ERDS2TJ102	1/4W 1K
R631	ERDS2TJ103	1/4W 10K
R701, 702	ERD2FCVJ4R7T	1/4W 4.7 ⚠
R703, 704	ERDS2TJ152	1/4W 1.5K
R709	ERDS2TJ273	1/4W 27K
R710	ERDS2TJ103	1/4W 10K
R711, 712	ERD25FJ101	1/4W 100 ⚠
R713	ERDS2TJ103	1/4W 10K
R714	ERDS2TJ332	1/4W 3.3K
R715	ERDS2TJ152	1/4W 1.5K
R752	ERDS2TJ561	1/4W 560
R754	ERD2FCVJ4R7T	1/4W 4.7 ⚠
R755, 756	ERD25FVJ5R6T	1/4W 5.6 ⚠
R757	ERDS2TJ102	1/4W 1K
R758, 759	ERQ16NKR15E	1W 0.15
R801	ERDS2TJ102	1/4W 1K
		CAPACITORS
C101, 102	ECEA1HKA3R3B	50V 3.3U
C103, 104	ECBT1H101KB5	50V 100P
C107, 108	ECBT1E103ZF	25V 0.01U
C111	ECBT1H102KB5	50V 1000P
C112, 113	ECBT1H101KB5	50V 100P
C114	ECEA1HKA3R3B	50V 3.3U
C115	ECEA1CKA100B	16V 10U
C117	ECEA1HKA3R3B	50V 3.3U
C118, 119	ECBT1E103ZF	25V 0.01U
C120	ECBT1H101KB5	50V 100P
C191, 192	ECBT1H151KB5	50V 150P
C193, 194	ECBT1H101KB5	50V 100P
C201, 202	ECBT1H121KB5	50V 120P
C203-208	ECEA1HKA3R3B	50V 3.3U
C209, 210	ECEA1HKA010B	50V 1U
C211, 212	ECEA1HKAR22B	50V 0.22U
C213, 214	ECEA1HKAR47B	50V 0.47U
C215, 216	ECFR1E823KR	25V 0.082U
C217, 218	ECEA1HKAR15B	50V 0.15U
C219, 220	ECFR1E333KR	25V 0.033U
C221, 222	ECFR1E683KR	25V 0.068U
C223, 224	ECFR1E153KR	25V 0.015U
C225, 226	ECFR1E273KR	25V 0.027U
C227, 228	ECFR1E562KR	25V 5600P
C229, 230	ECFR1E103KR	25V 0.01U
C231, 232	ECFR1E222KR	25V 2200P
C233, 234	ECFR1E472KR	25V 4700P
C235, 236	ECKD1H681KB	50V 680P
C240	ECBT1E103ZF	25V 0.01U
C242	ECEA1AKA470B	10V 47U
C243-247	ECBT1E103ZF	25V 0.01U
C248, 249	ECBT1H101KB5	50V 100P
C251, 252	ECBT1E103ZF	25V 0.01U
C308	ECEA1CKA100B	16V 10U
C309, 310	ECEA1HKA3R3B	50V 3.3U
C311, 312	ECBT1H101KB5	50V 100P
C321, 322	ECEA1AKA330B	10V 33U
C331	ECQM1H102JZ	50V 1000P
C351, 352	ECBT1H102KB5	50V 1000P
C504	ECKR1H473ZF5	50V 0.047U
C601	ECEA1HKAR47B	50V 0.47U
C602	ECEA1HKA2R2B	50V 2.2U
C603	ECEA0JKA101B	6.3V 100U
C604	ECBT1E103ZF	25V 0.01U
C605	ECEA1CKA220B	16V 22U
C606, 607	ECBT1E103ZF	25V 0.01U
C608	ECEA0JKA101B	6.3V 100U
C609	ECBT1E103ZF	25V 0.01U
C610, 611	ECEA1HKA010B	50V 1U
C612	ECBT1E103ZF	25V 0.01U
C613-617	ECBT1H101KB5	50V 100P
C701, 702	ECA1EM221B	25V 220U
C703, 704	ECEA1CKA470B	16V 47U
C705	ECA1HM221B	50V 220U
C706	ECA1EM471B	25V 470U
C707	ECEA1CKA100B	16V 10U
C709	ECEA1HKA010B	50V 1U
C710	ECKT1H223ZF	50V 0.022U
C711, 712	ECKR1H103ZF5	50V 0.01U
C713, 714	ECKT1H223ZF	50V 0.022U
C715	ECKR1H103ZF5	50V 0.01U
C719	ECKR1H103ZF5	50V 0.01U
C721	ECEA0JKA101B	6.3V 100U
C751, 752	ECA0JM102B	6.3V 1000U
C753	ECEA1CKA100B	16V 10U
C754	ECA1EM101B	25V 100U
C761, 762	ECEA1CKA100B	16V 10U
C801	ECBT1H101KB5	50V 100P

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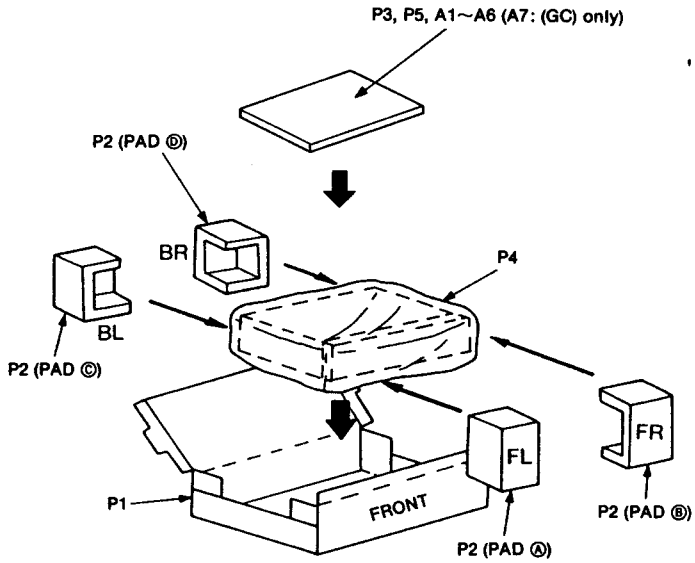
Ref. No.	Part No.	Part Name & Description	Remarks
S701	SSR187-1	SW, VOLTAGE SELECTOR	(GC) ⚠
		CONNECTOR (S) & SOCKET (S)	
CN701	SJT30643-V	CONNECTOR (6P)	
CN602A	RJU003KD10M1	SOCKET (10P)	
CN603A	RJU003KD06M1	SOCKET (6P)	
CN604A	SJS50581BB	SOCKET (5P)	
CN605A	SJS50581BB	SOCKET (5P)	
CN606A	RJU003KD08M1	SOCKET (8P)	
CN802A	SJS50581BB	SOCKET (5P)	
CN804A	RJU057W004	CONNECTOR (4P)	
CN701A1, 2	RJS1A1703	CONNECTOR (3P)	
CN602B	RJT003KD10M1	CONNECTOR (10P)	
CN603B	RJT003KD06M1	CONNECTOR (6P)	
CN604B	SJT30549BB1	CONNECTOR (5P)	
CN605B	SJT30549BB1	CONNECTOR (5P)	
CN606B	RJT003KD08M1	CONNECTOR (8P)	
CN802B	SJT30549BB1	CONNECTOR (5P)	
CN804B	RJT057W004-1	CONNECTOR (4P)	
		JACK (S)	
JK1	SJF3069-2N	INPUT/OUTPUT TERMINAL	
JK101	RJJ65MA01	MIC JACK	
JK601	RJJ33T01	M3 JACK (OUT)	
JK602	RJJ33T01	M3 JACK (IN)	
		GND PLATE	
E1	SNE1004-1	GND PLATE	
		FUSE HOLDER (S)	
FC701, 702	EYF52BC	FUSE HOLDER	(E, EB, EG, GN)
		TRANSFORMER	
PT1	RTP1K4B012	POWER TRANSFORMER	(E, EB, EG, GN) ⚠
PT1	RTP1K4E020	POWER TRANSFORMER	(GC) ⚠

■ PACKING



(PAD Ⓐ Ⓑ Ⓒ Ⓓ: Part No. RPN0413-1)

ORDER NO. AD9302081S8

Service Manual

Supplement

Stereo Graphic Equalizer

Equalizer

SH-E51

Colour

(K)... Black Type

Area

Suffix for Model No.	Area	Color
(E)	Continental Europe.	(K)
(EB)	Great Britain.	
(EG)	F.R. Germany & Italy.	
(GC)	Asia, Latin America, Middle Near East and Africa.	
(GN)	Oceania.	

Please file and use this supplement manual together with the service manual for Model No. SH-E51, Order No. AD9104089C8.

Note:
This supplement is intended to provide additional information or corrections to the existing service manual for Model No. SH-E51.
Be sure to update your service manual for future reference.

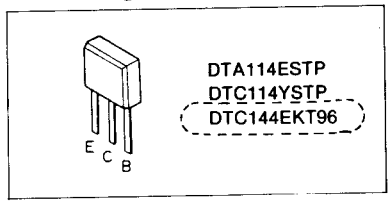
CORRECTION

■ REPLACEMENT PARTS LIST

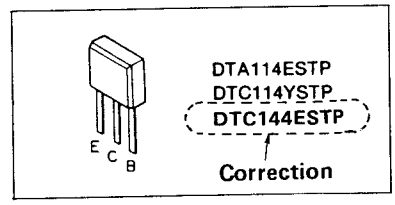
Ref. No.	Change of Part No. ORIGINAL → NEW		Part Name & Description	Remarks
TRANSISTOR(S)				
Q501, 502	DTC144EKT96	**DTC144ESTP**	TRANSISTOR	

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

ORIGINAL



NEW



Technics

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